User's Manual

Comet and Galaxy Series Multiport Controllers

Asynchronous and Synchronous Communications for SBus™-equipped SPARC systems

Comet Models: 401SX, 800SX

Galaxy Models: 401S+, 800S+

15-00002-00 Rev. A

Printed in the United States of America

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Comet and Galaxy Serial Controllers

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EN 55022 Class A
EN 60801-2
EN 60801-3
EN 60801-4

Jim Reinhold

Jim Reinhold, President

Warning
This is a Class A product. In a domestic environment, this product may cause radio interference in which case the user may be required to take adequate measures

FCC Notices

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Note: this equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Contents

PREFACE

About this Book

The Comet and Galaxy Series Multiport Controllers *User's Manual* describes how to install and use Aurora Technologies' asynchronous/synchronous communications controllers for SPARC systems and SPARC system clones.

We've organized this manual as follows:

CHAPTER 1 *Introduction*	Provides a technical overview of each model available for SPARC systems.
CHAPTER 2 *Hardware Installation*	Describes procedures for installing the card and connecting peripherals.
CHAPTER 3 *Software Installation and Configuration*	Describes the board driver installation, asynchronous port services setup, and synchronous driver installation.
CHAPTER 4 *Using the Multiport Software*	Describes administration of ports and configuration of synchronous boards for multiple protocols.

CHAPTER 5 *Troubleshooting*	Describes what to do if you experience problems with the communications controller. It lists error messages and explains how to run diagnostics.
APPENDIX A *Cables and Connectors*	Provides wiring diagrams and general cabling information.
APPENDIX B *Warranty*	Describes Aurora's warranty and support policies.

Who Should Use This Book

This book is a reference manual for anyone who wants to install, configure, and use Aurora Communications Controllers in SPARC system compatibles.

Related Manuals

For more information, refer to the following manuals:

- Your SPARC system's Installation Guide
- Your SPARC system's Owner's Guide
- Your Solaris documentation
- Your peripheral's documentation.

Documentation Conventions

Unless otherwise noted in the text, this document uses the following symbolic conventions:

`screen text`	ASCII text that the system displays appears in `plain typewriter` font.
screen display	Graphic text that appears on menus and dialog boxes appears in sans serif font.
`literal input`	Bold words or characters in formats and command descriptions represent commands that you must type literally. Literal values are in the **`bold typewriter`** font.
<***non-literal input***>	<***Bold, italic, bracketed***> words or characters in formats and command descriptions represent values that you must supply. Do not type the brackets.
`command`	Pathnames and commands in the text appears in `plain typewriter` font.
emphasis	*Italics* are used in the text for emphasis, titles, and variables.
❒	This symbol indicates the end of a chapter.
	This symbol marks procedures.
	This symbol marks cautionary notes about possible damage to your equipment or data.

Getting Help

If you need to reach us, you can contact us by

- The Web: **www.auroratech.com** for product literature, phone numbers and address.
- Phone service: 781.290.4800 Mon–Fri, 8:30AM–6:00PM Eastern Time. Press **4** for Customer Service and Support. For faster service, have your product serial number and your system information available.
- FAX: Attn: Customer Service and Support
- Email: **support@auroratech.com**
- Mail: Attn: Customer Service and Support

Registration

To receive warranty coverage on your Aurora product, you must fill out and mail back the Aurora Warranty Registration Card that is located in the back of this manual. Phone support can only be provided after product registration is complete. Hardware and Software Maintenance Agreements can be provided for extended customer support.

Sending in this card also lets us keep you up-to-date on the complete line of Aurora Technologies' products.

If you have any questions or comments on your Aurora Technologies' product, contact our Customer Support Department at **support@auroratech.com** or your sales representative. We're always listening to you! ❒

CHAPTER 1 *Introduction*

Congratulations on purchasing your Aurora Technologies' Communications Controller. Combining on-board RISC processing, dedicated data buffers, and flow control processing, Aurora communications controllers off-load communications overhead from your host CPU and your network for optimum system performance.

Aurora offers three performance levels of SBus expansion solutions for asynchronous/synchronous serial communications:

- the powerful SX Series is equipped with extended buffers for asynchronous data integrity and high throughput.
- the versatile S+ Series provides high-speed WAN communications, operates with several standard synchronous communication protocols, and allows immediate detection of hardware link failures for fault tolerant and other critical applications.

The SX and S+ Series include 4 and 8-port models. For even higher capacities, Aurora offers the LANMultiServer and WANMultiServer series.

On-board RISC intelligence, flexibility, and configurability make Aurora the most reliable, cost-effective source of system connectivity. In addition, Aurora Technologies' device driver software provides the following unique features:

- the ability to set asynchronous data rates up to 115.2 kbps
- the ability to configure a mix of asynchronous and synchronous protocols on synchronous/asynchronous boards.

System Requirements

Aurora's communications controllers are designed to work with a wide range of SPARCstations and SPARCstation compatibles. As long as your SPARCstation meets the following minimum system requirements your communications controllers should work superbly.

Workstation	SPARCstation
Operating System	Solaris (See Driver Release Note for supported releases.)
CPU	SPARC
Bus	SBus
Memory	16 MB minimum
Disk Space	1 MB free in `/opt` (Solaris)
Medium	CD-ROM (optional)

Technical Specification Overview

Table 1 provides a technical specification overview of Aurora asynchronous serial expansion cards for SPARC systems.

TABLE 1. *Technical Specifications Overview of Asynchronous Sbus Cards.*

	401SX	800SX
Ports	4	8
Signal	RS-232/RS-422	
Connector	DB25 DTE/RJ-45	
Speed	50 bps–115.2 kbps	
Start/Stop bits	1 and 2 1.5 for Solaris	
Data bits	5, 6, 7, or 8 bits	
Interrupt Level	SBus 3,4,5,7	
Flow Control	Hardware: CTS/RTS Software: XON/XOFF,	
Modem support	All lines RTS, CTS, DSR, CD, DTR	
I/O Buffer (per port)	2048 bytes	1024 bytes

Table 2 provides a brief overview of the synchronous capabilities of Aurora's synchronous/asynchronous S+ expansion cards. These cards also support the asynchronous capabilities shown in Table 1.

TABLE 2. *Technical Specifications for Synchronous/ Asynchronous Sbus Cards*

	800S+	401S+
Ports	8	4
Signal	RS-232/RS-422	
Connector	DB25 DTE / RJ-45	
Speed	50-115.2 kbps baud	

TABLE 2. *Technical Specifications for Synchronous/ Asynchronous Sbus Cards*

	800S+	401S+
Data Encoding	NRZ, NRZI, Manchester	
Data Format	Bit Synchronous, Byte Synchronous	
Interrupt Level	SBus 3,4,5,7	
Duplex Support	Full & Half	
Clocking	external: T_xC_{in}, R_xC_{in} internal: T_xC_{out}	
Modem Support	RTS, CTS DTR (without internal clock)	All lines RTS, CTS, DSR, CD, DTR
I/O Buffer (per port)	1024 bytes	2048 bytes

Installation Overview

Table 3 provides an overview of how to install your communications controller and the Aurora Asynchronous/Synchronous drivers.

TABLE 3. *Installation Overview*

STEP	Go to
1. Unpack the Aurora card	Chapter 2
2. Install the card in an empty slot	Chapter 2
3. Connect devices to the Aurora ports	Chapter 2
4. Install the device driver	Chapter 3
5. Set up port services for the asynchronous ports	Chapter 3
6. Install sync protocol *(optional)*	Protocol Package Documentation

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CHAPTER 2 *Hardware Installation*

This chapter describes how to install the controller card and consists of the following:

- *Installation Precautions*
- *Unpacking the Controller Card*
- *Other Things You'll Need*
- *Installing and Removing Cards*
- *Connecting Peripherals to the Controller Card*

Before beginning the installation, record the following information in the *Product Information Worksheet* at the back of this book.

- Controller card serial number
- The model number and name of the system in which you have installed our product (e.g., SPARCstation 5).
- The version of the operating system that your system is currently running (e.g., Solaris 8).

Then fill out and mail the product registration card inside the back cover, in order to be eligible for technical support.

Installation Precautions

Taking the precautions described in this section should help you avoid injuring yourself or damaging your equipment.

CAUTION: Electrostatic discharge and static electricity can damage integrated circuits on your controller cards.

To prevent such damage from occurring, observe the following precautions during board unpacking and installation.

- Handle circuit boards and cards only by their non-conducting edges once you have removed them from their protective antistatic bags.
- Stand on a static-dissipative mat.
- Wear a grounding strap to ensure that any accumulated electrostatic charge is discharged from your body to the ground.
- Install circuit boards and cards as soon as you remove them from their protective anti-static packaging.
- Do not leave boards exposed after you unpack them.
- If you must put a board or card down, place it on anti-static packaging or on a rubber mat.
- For SPARCstation models 5, 10, 20, 1000, and 2000, you must remove the adapter bracket from the top of the card's faceplate. See Figure 1.

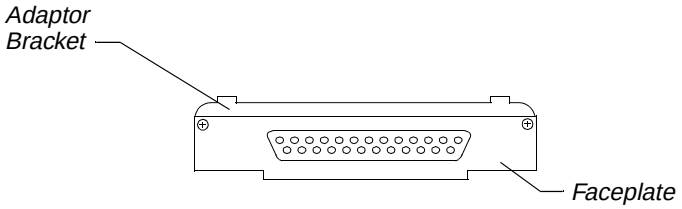

FIGURE 1. *Removing the Adaptor Bracket*

Unpacking the Controller Card

Remove the card from the packing box. Leave the card in its anti-static bag. Check the shipping carton contents to ensure that you have all of the required parts, as listed in Table 4.

> **Note:** Save the shipping carton and the internal packaging. If you need to ship the product back to your dealer, you must use the original carton and packaging.

TABLE 4. *Communications Controller Parts List*

Qty	400S+/401S+	800SX/800S+
1	Controller Card	Controller Card
1	4-port DB-25 distribution cable or break-out box	8-port DB-25 distribution cable or brea-kout box
1	Serial test plug	Serial test plug
1	User's Manual with Driver Distribution CD-ROM	User's Manual with Driver Distribution CD-ROM
1	Driver Release Note	Driver Release Note

Other Things You'll Need

To ensure a smooth installation, you should have the proper cabling and tools on hand.

Cabling

There are a number of cabling approaches you can use to connect devices to the new Aurora ports. If you are not sure what you need, refer to Appendix A.

Tools

You'll need the following tools to install your controller card:

- Any tools listed in your SPARCstation's documentation.
- A small flat-head screwdriver to make cable connections and secure mounting screws.

Installing and Removing Cards

Detailed installation and removal procedures for SBus cards can be found in your SPARCstation's installation or hardware documentation. Be sure to take the precautions listed earlier in this chapter and any additional ones that are recommended in your SPARCstation documentation.

Your SPARCstation documentation also explains how the SBus slots are numbered and any special considerations you should note. When all the controller cards are installed in their slots, record their slot numbers; you will need to know them when you set up your port services.

Connecting Peripherals to the Controller Card

Each controller card is shipped with either a distribution cable or distribution box that attaches to the controller card and breaks out the Aurora ports. The boxes contain jumpers that are used for certain wiring configurations (Refer to Appendix A for more information).

The Aurora ports are broken out to male DB-25 connectors. You must supply cabling that connects your peripheral devices to the DB-25 connectors on your breakout device.

To connect a peripheral device to the controller card

1. Attach the distribution cable or box to the controller card. Tighten the thumbscrews securely. Make sure the cable or box is supported so that there is no unnecessary stress on the controller card connector.

CAUTION: Lack of mechanical support for distribution cables and boxes may cause intermittent connections and damage to the controller card. Always provide stress relief for the cabling.

2. Choose the correct peripheral cable.[1]

3. Attach one end of the cable to the peripheral, and the other to one of the distribution connectors.

4. Record the slot number of the controller card and the port number of the Aurora port.

The breakout connectors are numbered to match the device names that will be created when the driver software is installed. You will need to know which port the peripheral was connected to when you set up port services for it.

1. This cable is not provided. If you are not sure what cable type to use, refer to Appendix A.

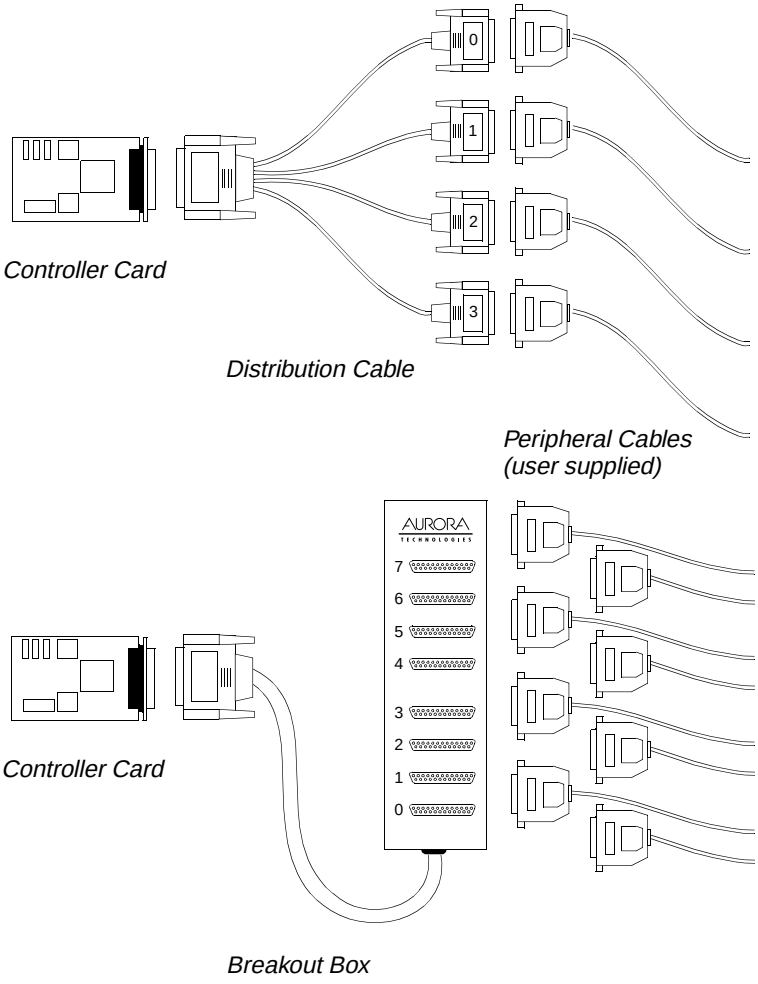

FIGURE 2. *Connecting Peripherals to four and eight-port Controller Cards*

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CHAPTER 3 *Software Installation and Configuration*

The Multiport controller card device drivers allow your SPARCstation to communicate with various asynchronous and synchronous serial devices (such as printers, terminals, or modems) through the Aurora ports.

A CD-ROM containing device driver software and an installation script is shipped with your Aurora Multiport card. The Release Note accompanying the device driver CD-ROM provides detailed driver installation procedures.

This chapter presents the following:

- *Installing the Device Drivers*
- *Asynchronous Device File Names*
- *Setting Up Asynchronous Port Services*
- *Synchronous Configurations*

Before performing the software installation procedures, you should have installed the Multiport controller card hardware.

Installing the Device Drivers

After you have installed your new Aurora hardware, follow the device driver software installation procedures in the Driver Release Note to install the driver.

You only need to install the driver once, even if you are installing more than one Aurora Multiport controller card. One device driver can support up to sixteen controller cards.

After you have installed the driver software, proceed with the setup and configuration procedures that follow in this chapter.

Free Driver and Release Note Downloads

You can download the latest versions of all Aurora drivers and release notes from the Aurora Technologies web site. Use the following procedure

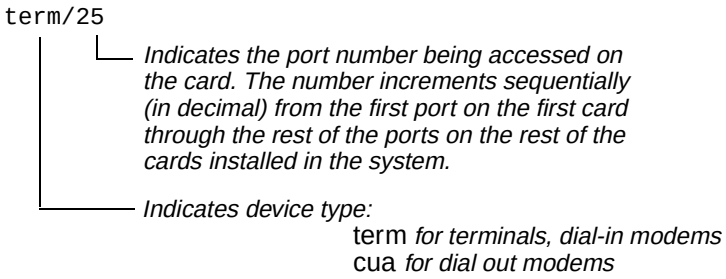
✎ *To download from the Aurora web site*

1. Using your favorite browser, go to www.auroratech.com.
2. Click on “Support”.
3. Click on “Drivers”.
4. Follow the instructions provided on the displayed web page.

Asynchronous Device File Names

Each serial port connected to terminals, modems, etc., needs to be identified by one or more device files, depending on the intended use of the port. Device file naming conventions vary, depending on the device's use.

The format for device file names is defined as:



The install script automatically creates Solaris device files for each new port on the controller card. Table 5 shows the device files created on a system with a eight-port card installed in the first available slot and a four-port card installed in the next available slot.

On that system, the terminal device for the port labelled *3* on card #2 would be accessed by the `term/11` device file.

TABLE 5. *Solaris Device Names for eight-port and four-port Controller Cards*

Port Label	Async Terminal (Dial-in Modem)	Async Modem (Dial-out)
Controller card 1		
0	/dev/term/0	/dev/cua/0
1	/dev/term/1	/dev/cua/1
2	/dev/term/2	/dev/cua/2
3	/dev/term/3	/dev/cua/3
4	/dev/term/4	/dev/cua/4
5	/dev/term/5	/dev/cua/5
6	/dev/term/6	/dev/cua/6
7	/dev/term/7	/dev/cua/7
Controller card 2		
0	/dev/term/8	/dev/cua/8
1	/dev/term/9	/dev/cua/9
2	/dev/term/10	/dev/cua/10
3	/dev/term/11	/dev/cua/11

Setting Up Asynchronous Port Services

Once your peripherals are connected and the Aurora software packages are installed, the next step is to set up the appropriate port services for each peripheral.

Solaris has a number of tools available for administering port services. You should familiarize yourself with the man pages on `sacadm`, `pmadm`, `ttyadm`, and `lpadmin` before attempting to connect peripherals to the Multiport controller card serial ports.

There are also two window-based Administration Tools, the Serial Port Manager and the Printer Manager, that can simplify many tasks. However, in some cases they may not provide sufficient control over communications parameters to allow you to optimize the performance of your peripheral. For example, if you decide to use the Printer Manager to set up printer services, you will find that you can't vary the baud rate.

In this section we do not address the Serial Port Manager or the Printer Manager; we simply provide examples of how these commands might be used. If you want more information see SunSoft's *Adding and Maintaining Peripherals* for the Serial Port Manager, and *Setting Up User Accounts, Printers, and Mail* for the Printer Manager.

Setting Up Printer Services

Setting up printer service in Solaris requires the `lpadmin`, `accept`, and `enable` commands. The following example sets up a printer named `testlp` on port 0 running at 38,400 baud.

```
system% lpadmin -p testlp -v /dev/term/0 -T \
hplaserjet -D "testlabel" -o nobanner -o \
"stty='38400 cs8 -parenb -cstopb -crtscts ixon \
tabs'"
system% accept testlp
system% enable testlp
```

For More Information. Refer to your printer manual for details on how to set its transmission characteristics (baud rate, bits/char., parity) and flow control (software/hardware).

Refer to SunSoft's *Setting Up User Accounts, Printers, and Mail* manual for more information about using the Printer Manager and setting up printer services. This manual is accessible on-line through the System Administrator Answerbook, or can be ordered from SunSoft.

Setting Up Terminal Services

Setting up terminal service in Solaris requires the `sacadm` and the `pmadm` commands. The following example sets up a typical terminal.

✎ *To set up services for a typical terminal*

1. Create a new port monitor using `ttyaur0` as the `PMTAG` name:

   ```
   system% sacadm -a -p ttyaur0 -t ttymon -c \
   /usr/lib/saf/ttymon -v 1
   ```

   If you get the message `ttyaur0 already exists`, it simply means that someone has already created `ttyaur0`.

   We recommend a unique `PMTAG` name for every 16 Aurora ports (in other words, a unique name for each expansion unit you have). `ttaur0`, `ttaur1`, . . . is our suggestion for PMTAG names; you could use something else if you prefer. However, it is important *not* to use a name of the form `ttymon`***xx*** as the PMTAG name.

2. Check the status of the port monitor:

   ```
   system% pmadm -l
   ```

3. Remove the existing service (`ttymon0`) from the port to be administered (in this case port 0):

   ```
   system% pmadm -r -p ttymon0 -s 0
   ```

If the Aurora board is the only serial device using `ttymon0` as a PMTAG name, you can remove the services from all ports by typing:

```
system% sacadm -r -p ttymon0
```

4. Start a port monitor service for a specific port (in this case, a Wyse 50 terminal running at 38.4 Kbps):

```
system% pmadm -a -p ttyaur0 -s 0 -i root -fu -v1 \
-m "‘ttyadm -c -d /dev/term/0 -l 38400 \
-s /usr/bin/login -m ldterm -T wyse50 -S n‘"
```

5. Repeat steps 2–4 to set up other terminal ports.

For More Information. Refer to your terminal manual for details on how to set its transmission characteristics (baud rate, bits/char., parity) and flow control (software/hardware).

Refer to SunSoft's *Adding and Maintaining Peripherals* manual for more information about using the Serial Port Manager and setting up terminal services. This manual is accessible online through the System Administrator Answerbook, or can be ordered from SunSoft.

Bypassing the Carrier Detect (CD) Line

If you are using 3-wire cabling (or for some other reason the CD line will not be pulled high), you must bypass the CD line for terminal and printer ports. This is done by instructing the driver to assume the CD line is high regardless of its actual state.

The easiest way to do this is using the Serial Port Manager. Just edit the port service by checking off the Software Carrier option in the Modify Service dialog box.

Alternatively, you can make the driver assume the CD line is high by typing

```
system% /opt/AURAacs/ttysoftcar -y <device>
```

To restore the CD line to its normal, driven state, type

```
system% /opt/AURAacs/ttysoftcar -n <device>
```

You can query the state of the software carrier by typing

```
system% /opt/AURAacs/ttysoftcar <device>
```

If you need to bypass the CD line from a C program, open the port using the `O_NDELAY` flag, and issue the following `ioctl` call:

```
int val=1;
ioctl(fd, TIOCSSOFTCAR, &val);
```

Note: Do not use bypass the CD line on serial ports connected to modems.

Setting Up Modem Services

Setting up modem service in Solaris requires the `sacadm` and the `pmadm` commands. The following example sets up a typical bidirectional modem.

To set up services for a typical bidirectional modem

1. Create a new port monitor using `ttyaur0` as the `PMTAG` name:

   ```
   system% sacadm -a -p ttyaur0 -t ttymon -c \
   /usr/lib/saf/ttymon -v 1
   ```

   If you get the message `ttyaur0 already exists`, it simply means that someone has already created `ttyaur0`.

   We recommend a unique `PMTAG` name for every 16 Aurora ports (in other words, a unique name for each expansion unit you have). `ttaur0`, `ttaur1`, . . . is our suggestion for PMTAG names; you could use something else if you prefer. However, it is important *not* to use a name of the form `tty-mon`***xx*** as the PMTAG name.

2. Check the status of the port monitor:

   ```
   system% pmadm -l
   ```

3. Remove the existing service (`ttymon0`) from the port to be administered (in this case port 0):

   ```
   system% pmadm -r -p ttymon0 -s 0
   ```

4. Start a port monitor service for a specific port (in this case, a bidirectional modem running at 38.4 Kbps):

   ```
   system% pmadm -a -p ttyaur0 -s 0 -i root -fu -v 1 \
   -m "‘ttyadm -b -d /dev/term/0 -l 38400 \
   -s /usr/bin/login -m ldterm -S n‘"
   ```

5. Now, add the modem to the `/etc/uucp/Devices` file using the following format:

   `ACU cua/0 - 38400 <`*`type`*`>`

   where *<type>* is either a built-in function (`801`, `Sytek`, `TCP`, `Unetserver`, `DK`) or one whose name appears in the `/etc/uucp/Dialers` file (`hayes`, `tbfast`, etc.).

6. Repeat steps 2–5 for other modem ports.

For More Information. Refer to your modem manual for details on how to set its transmission characteristics (baud rate, bits/char., parity) and flow control (software/hardware).

Refer to SunSoft's *Adding and Maintaining Peripherals* manual for more information about using the Serial Port Manager and setting up modem services. This manual is accessible online through the System Administrator Answerbook, or can be ordered from SunSoft.

Setting Asynchronous Data Rates

Aurora recommends that you use the SunSoft Admintool or Solaris `stty` command to set baud rates for asynchronous ports. See the Admintool documentation or the Solaris `stty(1)` man page for information on how to do this.

Synchronous Configurations

Your Aurora Multiport controller card supports multi-protocol configurations. In other words, you can configure the ports on the Multiport controller card expansion unit to support any combination of asynchronous and synchronous data-link protocols.

Synchronous Drivers

The Aurora synchronous driver `acss` supports frame level interfacing for byte-oriented frames (BISYNC), bit-oriented frames (HDLC and SDLC), and the Sun synchronous interface.

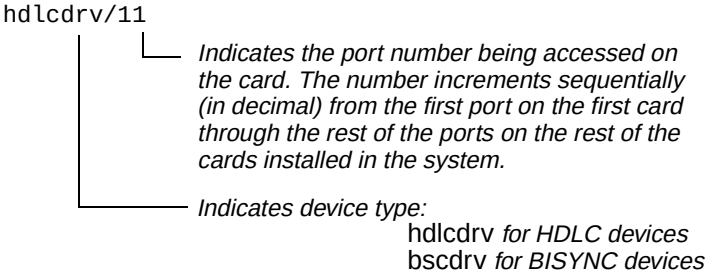
Other synchronous drivers may be used simultaneously or exclusively so that you can use other synchronous data link protocols (such as Frame Relay and PPP) with your Multiport controller card. Installing the Aurora Synchronous Device Driver is necessary if you plan to run one of Aurora's data link protocol software packages such as Aurora HDLC, Aurora X.25, etc.

Synchronous Device File Names

Each synchronous port needs to be identified by an appropriate device file name, depending on the type of data link protocol (bit synchronous, byte synchronous, Sun synchronous) to be used on the port.

The system automatically creates Solaris device files for each new port on the Multiport controller card expansion unit. Table 6 shows the device files created for an eight-port card installed in the first available slot and a four-port card installed in the next available slot.

The format for synchronous device file names is defined as:



In this example, an HDLC device connected to the port labelled *3* on the card in the second slot is accessed by the `hdlcdrv/11` device file.

SunLink® Support

Some applications require SunLink device names of the form `/dev/zsh`*x*. If you plan to run such an application over your expansion ports, first run `/opt/AURAacs/zshreplace`.

Note that after running this script, you will not be able to use the SPARCstation serial ports A and B as `zsh` devices due to inevitable device name conflicts (however, those ports *can* be used for async connections using device names such as `/dev/term/`*x* or `/dev/cua/`*x*).

TABLE 6. *Synchronous device file names for two daisy-chained Multiport controller card expansion units*

Port Label	Aurora Interface	Bit Synchronous (HDLC, SDLC)	Byte Synchronous (BISYNC)	Sun Synchronous (SSIF)
Multiport Card 1				
0	/dev/sync/0	/dev/hdlcdrv/0	/dev/bscdrv/0	/dev/acss0
1	/dev/sync/1	/dev/hdlcdrv/1	/dev/bscdrv/1	/dev/acss1
2	/dev/sync/2	/dev/hdlcdrv/2	/dev/bscdrv/2	/dev/acss2
3	/dev/sync/3	/dev/hdlcdrv/3	/dev/bscdrv/3	/dev/acss3
4	/dev/sync/4	/dev/hdlcdrv/4	/dev/bscdrv/4	/dev/acss4
5	/dev/sync/5	/dev/hdlcdrv/5	/dev/bscdrv/5	/dev/acss5
6	/dev/sync/6	/dev/hdlcdrv/6	/dev/bscdrv/6	/dev/acss6
7	/dev/sync/7	/dev/hdlcdrv/7	/dev/bscdrv/7	/dev/acss7
Multiport Card 2				
0	/dev/sync/8	/dev/hdlcdrv/8	/dev/bscdrv/8	/dev/acss8
1	/dev/sync/9	/dev/hdlcdrv/9	/dev/bscdrv/9	/dev/acss9
2	/dev/sync/10	/dev/hdlcdrv/10	/dev/bscdrv/10	/dev/acss10
3	/dev/sync/11	/dev/hdlcdrv/11	/dev/bscdrv/11	/dev/acss11

❒

CHAPTER 4

Using the Multiport Software

Aurora Technologies' Multiport device driver software delivers advanced features for unparalleled flexibility and convenience:

- *Viewing Port Parameters with acsinfo*
- *Administering Ports with mset*

Viewing Port Parameters with acsinfo

The `acsinfo` command allows you to view the current status of your expansion ports.

To use `acsinfo`, you must first

- Log in as root
- Change to the `/opt/AURAacs` directory

The syntax for `acsinfo` is

```
system# ./acsinfo [-ports] | [-drivers]
```

To view the port parameters

1. Type
   ```
   system# ./acsinfo -ports | more
   ```
2. Scroll through the listing using the space bar.

To view the active drivers

1. Type
   ```
   system# ./acsinfo -drivers | more
   ```
2. Scroll through the listing using the space bar.

See Figure 3 on page 25 for sample output from `acsinfo`. In that example an 800S+ card and a 401S+ card are installed in slots 3 and 4, respectively.

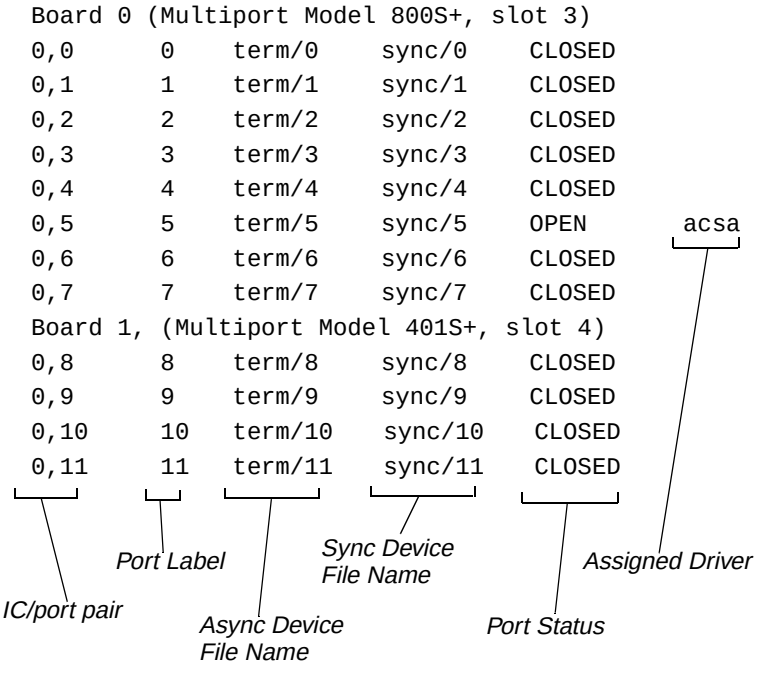


FIGURE 3. *Output from the acsinfo command*

Administering Ports with mset

Use the `mset` utility to reset hung ports, to set a port to use external clock, and to check the error statistics for the asynchronous lines in use.

mset Command Options Summary. The command format for `mset` is

`mset <`*`device_name`*`> <`*`option`*`>`

where

<*device_name*> is the device name

<*option*> is one of the command options listed in Table 10 on page 43.

❒

CHAPTER 5 *Troubleshooting*

This chapter describes problems you could possibly experience with your Comet or Galaxy Multiport Controller and the actions you should take to diagnose and solve those problems. Topics covered in this chapter include:

- *Installation Problems*
- *Clearing Hung Async Ports*
- *Running Hardware Diagnostics (drat)*
- *The xxtrace Driver Tracing Utility*
- *The mset Utility*
- *Calling for Support*

Installation Problems

If you experience problems immediately after the installation of your Comet or Galaxy Multiport Controller, check the following list of potential problem-sources.

- Is the equipment powered on?
- Is the power cord loose in the wall socket or at the connection to the system unit?
- Are the external equipment connections made properly?
- Are any connections to other boards loose?
- Is the device cable the correct type? If it is a null-modem cable is it the right kind of null-modem cable?

  The vast majority of problems are due to incorrect cable selection. For information on types of cable, see Appendix A, *Cables and Connectors*.
- If you're experiencing interference are you using properly shielded cables?

  Make sure that the cabling is not running near a power source; if it is try moving the cabling to a new location.
- Is the cable length correct?

  The RS-232 cable specification is 100 feet (30.5 m) at 9600 bps. The expansion unit uses powerful drivers that can support 38.4 kbps with cable lengths up to 200 feet (61 m).
- Is the SBus interface card properly seated in the system?

If the problem remains, try running the `drat` diagnostic. This diagnostic performs a complete check of all functional areas on the unit. For information on using `drat`, see "Running Hardware Diagnostics (drat)" on page 30.

If the diagnostic fails, note the error and call Customer Service and Support (See "Getting Help" on page xii.).

If the diagnostic provides no useful information, remove

- all Comet or Galaxy Multiport Controller software (see installation chapter for your operating system)
- the SBus interface card (see your SPARCstation hardware documentation for instructions).

Then try your system to determine whether it operates correctly.

If your system operates correctly, the problem may be with the Comet or Galaxy Multiport Controller.

Clearing Hung Async Ports

Asynchronous ports may occasionally hang due to a number of factors. If this occurs try some of the suggestions here. If all else fails, reboot your workstation.

✎ *To clear a hung async port*

1. Switch user to root:

   ```
   system% su
   Password: <root_password>
   system#
   ```

2. Run `ps` to get the process number for the program that has the port open:

   ```
   system# ps -ef
   ```

3. Use `kill` to remove the offending process:

   ```
   system# kill -9 <process_number>
   ```

   This should free up the port. If it doesn't, the process may be defunct. Use the appropriate procedure below to remove a defunct process from a port.

To clear a defunct process on port cua/8

1. Switch to the AURAacs directory
   `system# cd /opt/AURAacs`
2. Use the `mset` command to clear the port.
   `system# ./mset cua/8 -flush`

CAUTION: Never use the `mset -flush` command on a functioning port. Loss of data will result.

Running Hardware Diagnostics (drat)

The Direct Register Access Test (`drat`) diagnostic tests the basic functionality of Comet or Galaxy Multiport Controllers by directly accessing the board registers from user mode. The `drat` diagnostic has its own set of commands. Most commands have required arguments or need the serial test connector.

Serial Test Connectors

Aurora Technologies supplies a serial test plug that you need to use when running several of the `drat` tests. This serial test plug, when installed on the port connector, feeds signals from an output pin to the corresponding input pin. Figure 4 shows the test plug wiring.

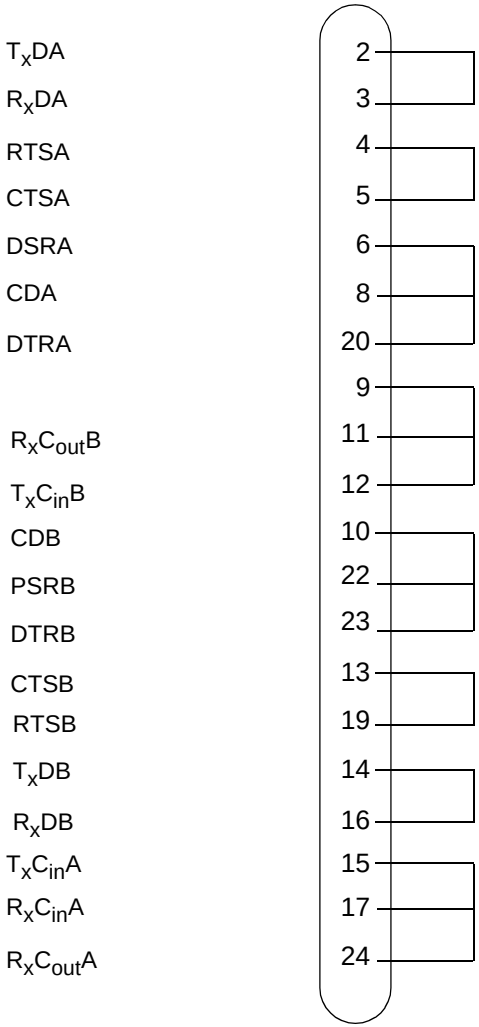


FIGURE 4. *Serial Test Plug Signals (DB-25)*

`drat` tests one port on one board at a time. Port parameters are fixed at:

- 9600 baud
- 7 Bits
- Even Parity
- One Stop Bit

`drat` does not loop data between ports or between boards.

Before running `drat`, the Comet or Galaxy Multiport Controller device driver must be unloaded. `drat` takes over the whole board and changes the settings of every port. After exiting `drat`, you need to reinitialize the board that you tested by rebooting the system and reinstalling the Aurora device drivers. Refer to the Device Driver Release Note that came with this product for assistance with installing and removing the device driver.

CAUTION: If the Aurora device drivers are not uninstalled before running drat, the SPARCstation may crash.

drat Command Summary

Table 8 on page 34 provides descriptions of the basic `drat` commands. When using `drat`, keep the following points in mind:

- The prompt always shows the current board selection, and on entering a port number, the prompt changes to the current board/current port selection.
- Most commands require a board and port selection.
- Typing a question mark (?) shows a listing of all commands.
- You can abbreviate all commands.
- Board and port arguments are required with some commands and test options.
- Serial test plugs are required with most commands and tests options.

Test Options. Table 7 lists the `drat diagnostic test` command options that are currently available. Most of the test options require:

- the selection of a board or board/port.

  You must specify the board or board/port *before* you can run the test.

- the use of the serial test plug on the selected port.

To execute a test option, enter

`test <`*`test name`*`>`

For example, to test on-board memory, type

`board 1>` **`test memory`**

TABLE 7. *Test Option Summary*

Test Option	Description
`csr`	Checks the board's control / status register. Requires board selection.
`dma`	Checks direct memory access on a per port basis.
`handshake`	Checks the board's handshake signals (CD,DTR, DSR, RTS, CTS). Requires board / port selection. Serial test plug required on selected port.
`loop-back`	Checks data transmission and loopback on designated port. Requires board / port selection. Serial test plug required on selected port.
`memory`	Tests on-board memory. Requires board selection.
`port`	Runs the loop-back and handshake signals on the designated port and performs `csr` testing. Requires board / port selection. Serial test plug required on selected port.
`regs`	Checks hardware registers on a per port basis.

TABLE 8. *drat Command Summary*

Command	Description
board <***number***> (selection command)	Selects an SBus interface card. <*number*> is the number of the card (0...n) you want to test. This option sets / resets the board prompt to the number specified.
^C	Aborts a test and deselects board and port.
port <***number***> (selection command)	Selects a port. <*number*> is the number of the port (0...3) you want to test. This option sets / resets the board / port prompt to the number specified. Requires board / port selection.
prom	Checks the prom on the system interface card.
test ?	Shows available tests and subcommands. Requires board / port selection.
test <***name***>	Runs the test specified. <*name*> is the name of the test you want to run. See the next section for a listing of all options and requirements.
modem ?	Shows available modem subcommands. Requires board / port selection.
modem show	Shows status of all modem lines (dsr, cd, ctr, dtr, rts). Requires board / port selection.
repeat <***command***> <***arg***>	Repeats a command until a key is typed.
send <***string***>	Use to send strings to selected port. Port parameters are fixed at 9600 baud, 7 bits, even parity, one stop bit. Requires board / port selection.
receive	Use to receive data from selected port. Type any character to quit. Port parameters are fixed at 9600 baud, 7 bits, even parity, one stop bit. Requires board / port selection.

TABLE 8. *drat Command Summary (Continued)*

Command	Description
on-line	Use for bi-directional character mode data exchange. Press **<Esc>** to quit. Port parameters are fixed at 9600 baud, 7 bits, even parity, one stop bit. Requires board / port selection.
modem <***signal***> <***action***>	Use to test modem lines, where <*signal*> is one of the following: **dtr, rts** <*action*> is one of the following: **0**, **off** - drop line **1**, **on** - raise line **toggle** - toggle signal and sleep for 0.5 second. Use toggle with repeat command, for example, **repeat modem dtr toggle** Requires board / port selection.
quit	Leaves test program.

Running the drat diagnostic

To run drat

1. Log in as root.
2. Change to the **/opt/AURAacs** directory.
   ```
   system# cd /opt/AURAacs
   ```
3. Make sure that there are no processes running on any of the serial ports.
4. Type the following command to invoke `drat`.
   ```
   system# ./drat
   ```
   The screen displays information about the diagnostic and the system's configuration, similar to the following :

```
CD240x direct register access tests for Solaris 2.x Version 2.06
Wed Sep 16 16:22:00 EDT 1998
0. 'csfour' (4 ports
  at /devices/iommu@f,e0000000/sbus@f,e0001000/sbusmem@1,0:slot1
Type a board number (0) or q to quit:
```

> **Note:** The board number is the number that the drat diagnostic assigns to the card. The card in the lowest-numbered slot becomes board 0, the card in the next lowest slot number becomes board 1, and so forth.

5. Enter the number assigned to the board you want to test and press <Return>.

In the above example, the diagnostic recognizes that the system contains 2 cards. To test the first card, (a Comet or Galaxy Multiport Controller) you would enter 0 and press <Return>.

After you enter a board number, `drat` tests the memory on the board and reports back, as shown:

```
'AURA,acs' at /dev/sbus1 [multi]
memory test... passed
CSR test...passed
Expansion Unit 0: 16 lines with multiprotocol line drivers
  chip 0: CD2401-M with 32.768MHz clock, board address 0x100800
  chip 1: CD2401-M with 32.768MHz clock, board address 0x100900
  chip 2: CD2401-M with 32.768MHz clock, board address 0x100a00
  chip 3: CD2401-M with 32.768MHz clock, board address 0x100b00
type '?' for help.
board 0>
```

6. When the `board 0>` prompt appears, you can run a variety of tests.

See the two sections following for a complete listing of all command options and test options.

7. To exit `drat`, type **`quit.`**

> **Note:** After exiting `drat`, you need to reinitialize the board that you tested by rebooting the system.

drat Examples

This section shows two examples of commands you can run with the diagnostic.

Example 1: Using the `test` command. The `test port` diagnostic is a two-pass process:

- The first pass runs without the serial test plug connected to the port.
- The second pass runs with the serial test plug connected to the port.

The system prompts you when you need to add the serial test plug.

To use the test command

1. To select port 0 on board 0, enter:

   ```
   board 0> port 0
   ```

   The system displays the following:

   ```
   chip 0: CD2401-M with 32.767MHz clock, board address
   0x100800
   board 0/port 0>
   ```

   Notice that the prompt now identifies the board and port selections.

2. To test the port, enter:

   ```
   board 0/port 0> test port
   ```

   When the test port diagnostic runs, you'll see messages similar to the following:

   ```
   remove all connectors from port being tested
   type RETURN when ready -->
   ```

3. Press <Return> to begin the test.

As the test progresses, the system displays the following messages:

```
Testing port 0
Testing handshake lines...    passed
Loop-back test...             passed

install special STEST connector to port being tested
press RETURN when ready -->
```

4. Install the serial test plug to the connector labeled 0 on the Comet or Galaxy Multiport Controller.

5. Press **<Return>** to continue the test.

   The system displays the following messages:

```
Testing port 0
Testing cirrus registers...   passed
Testing handshake lines...    passed
Loop-back test...             passed
Async DMA test...             passed
HDLC DMA test...              passed
board 0/port0>
```

   If the test should fail, the display indicates the failure.

6. To test additional ports, enter the new port number at the `board 0/port 0>` prompt.

   For example to test port 1, enter:

```
board 0/port 0> port 1
```

7. The prompt changes to `board 0/port 1>.` You can now run various commands and test options on port 1.

Example 2: Using the `modem` command. This example shows how to use the `modem` diagnostic command to check/change the status of modem lines for board 0, port 1.

After making sure the prompt is set to board0/port1, you can check the current status of the port's modem lines by entering:

```
board 0/port 1> modem show
```

The diagnostic displays a status of the modem, similar to the following:

```
DSR:                    off
CD:                     off
CTS:                    off
DTR:                    off
RTS:                    off
```

To change the status of the DTR line by raising it, enter:

```
board 0/port 1> modem dtr on
```

You can verify the changed status by entering

```
board 0/port 1> modem show
DSR: off
CD:  off
CTS: off
DTR: on
RTS: off
```

The xxtrace Driver Tracing Utility

If you encounter a problem with your Aurora serial port product, a service representative may ask you to take a trace of your problem to help troubleshoot it. This section describes the steps of getting a driver trace using the driver tracing utility, `xxtrace`.

xxtrace Command Summary. Table 9 contains a summary of the `xxtrace` commands.

TABLE 9. *xxtrace Command Summary*

xxtrace Command	Description
`ld`	Loads the Comet or Galaxy Multiport Controller driver (async)
`ul`	Unloads the Comet or Galaxy Multiport Controller driver (async)
`xa`	Enables tracing on all ports

TABLE 9. *xxtrace Command Summary*

xxtrace Command	Description
xb ***n:p***	Enables tracing on a specific board / port
xc	Clears the trace buffer and restarts tracing, keeping the same ports and events active
xp	Dumps the contents of the trace buffer out of memory and prints it to stdout
xr	Clears the trace buffer and shuts off tracing
xs	Shows the current port(s) and events being traced

Running xxtrace

To run xxtrace

1. Log in as root

   Note: You must be logged in as root in a `csh` environment to run this test.

2. Change to the **`/opt/AURAacs`** directory:

   system# **`cd /opt/AURAacs`**

3. Enter the following to set up aliases:

   system# **`source sourceme`**

4. Enable tracing by entering one of the following:

   To enable tracing on *all* ports, type

   system# **`xa`**

   To enable tracing on a *specific* port, type

   system# **`xb n:p`** (*n* and *p* are in hexadecimal)

   where *n* is the board number in the system starting with 0, and *p* is the port number, starting with 0.

   For example, `xb 0:3` turns on tracing for the first Aurora card in the system for port 3.

5. To show that tracing is turned on, type:

   system# **xs**

   The system displays a list of all the trace points.

6. Reproduce the situation that was occurring when you encountered the problem.

7. *As soon as* the failure condition occurs (to avoid overwriting any buffers), dump the contents of the trace buffer out of memory and print it by typing:

   system# **xp**

   This command prints data to standard output. You can redirect the contents to a file, using this format:

   system# **xp > *<tmp/filename>***

   where <***filename***> is the name of the redirected output file in the `/tmp` directory.

8. Find out how many lines the trace output is by doing a **`wc -l`** on the file.

To clear the trace buffer and restart tracing, keeping the same port(s) and events active, enter

system# **xc**

If the output is not very long, you can FAX it to us. Otherwise, `tar` it to a diskette or CD and send it to Customer Service and Support. Alternatively, you may `compress`, `uuencode`, and e-mail it to

`support@auroratech.com`.

To make the system operational again

1. Clear the trace buffer and shut off tracing:

   system# **xr**

2. Now reboot the system:

   system# **reboot**

The mset Utility

The `mset` utility can be used to check the error statistics for the asynchronous lines in use (it is also used to set higher data rates). You can run `mset` when you are receiving data corruption errors on incoming data, such as

- Receiver Overruns: This occurs when the chip's FIFO is full, more data has arrived, and the system could not respond to the interrupt fast enough.
- Frame Errors: The data received was missing a stop bit.
- Parity Errors: The parity check was wrong.
- Dropped Characters: The OS did not have enough memory to handle the incoming data.

An on-line version of the `mset` command description is available in `/opt/AURAcs/doc .`

mset Command Options Summary

The command format for `mset` is

`mset` <*device_name*> <*option*>

where

<*device_name*> is the device name.
<*option*> is one of the command options listed in Table 10.

TABLE 10. *mset Options*

mset Option	Description
-<*baud_rate*> **-baud <*baud_rate*>**	Replaces the standard 38.4 kbps data rate setting (B38400) with the specified data rate. <*baud_rate*> is any whole integer from 38400 to 115200. Any time the port service is set to B38400 (38.4 kbps), the port actually operates at the specified data rate. This option should be used only with Customer Service authorization.
-dtrflow	Configures the driver to use DTR (pin 20) as the input hardware flow control pin. The DTR pin will function like RTS (pin 4). The RTS pin switches its function to act like DTR. Aurora supplies an "Async Modem Adapter" that will swap pin 4 with pin 20. This setting provides a 100% reliable form of hardware flow control for incoming data. This is because the state of the DTR pin is controlled by the CD2400 chip instead of the device driver. When data fills the chip's fifo beyond the hi-water mark, the chip will automatically drop the DTR pin when this option is enabled. The RTS pin is normally controlled by the device driver and thus requires host machine intervention to change state. The Communications Controller Model 401 Series cards route the DTR pin on the CD2401 to the RTS pin on the DB-25 connector. Therefore input hardware flow control (through RTS) is always going to be controlled by the chip. Don't use the dtrflow switch for 401 Series .
-dtrflow	Configures the driver to use DTR (pin 20) as the input hardware flow control pin. The DTR pin will function like RTS (pin 4). The RTS pin switches its function to act like DTR. (For Nova 1600SE this governs ports 0 through 11 only.) (Not available in ASE driver)

TABLE 10. *mset Options*

mset Option	Description
-icto	Sets the time, in milliseconds, that the device driver will wait for incoming data before pushing it upstream. If this time is not set, the device driver will wait until the incoming data fills the driver buffers before pushing the data upstream. See `-stdicto`.
-rtsflow	Configures the driver to use RTS (pin 4) as the input hardware flow control pin (see -dtrflow above).
-rtsflow	Configures driver to use RTS (pin 4) as the input hardware flow control pin (see -dtrflow above). (For Nova 1600SE this governs ports 0 through 11 only.) (Not available in ASE driver)
-show	Reports the current settings for the specified port.
-stats	Reports error statistics for the specified asynchronous port.
-statsr	(available for Board Driver Version 4.50+ / 5.50+) Reports the same information as -stats but also resets each statistics field to zero.
-statschk	Reports a list of all board / port numbers that have detected receiver overruns, frame errors, parity errors, or dropped characters. You must enter a device name with this option: any device name will work.
-statsreset	Resets all errors and statistics for all ports. You must enter a device name with this option: any device name will work.
-std	Resets the data rate to the original value of 38.4 kbps.
-stdicto	Resets the time delay set with `-icto` to none. In other words, incoming data will be pushed upstream only when the driver buffers get full.
-stdstop	Resets the stop bit setting.

TABLE 10. *mset Options*

mset Option	Description
-stop1_5	Sets the stop bit setting to 1.5 (Solaris only).
-timeout	Sets the time that the driver will wait during a close before forcing the close to complete if the close is waiting on transmit data. The default time is 15 seconds.

Using mset

To run mset

1. Log on as root
2. Change to the AURAacs directory:

   ```
   system# cd /opt/AURAacs
   ```

3. Type the following:

   ```
   system# mset <device_name> -statschk
   ```

   This prints a list of board/port numbers that have detected receiver overruns, frame errors, parity errors, or dropped characters. The output looks similar to this:

   ```
   The following channels have detected errors:
   Board 1, port: 3, 4
   Board 2, port: 2
   ```

   This indicates that the port labeled “3” and the port labeled “4” of the first board has detected errors and the port labeled “2” on the second board has detected errors.

4. To report the error statistics for the specified asynchronous port, enter:

   ```
   system# mset <device_name> -stats
   ```

This example shows 5 characters received with parity errors. It also shows that the port received 3021 characters and transmitted 21 characters.

```
receiver overruns:              <0>
receiver frame errors:          <0>
receiver parity errors:         <5>
receiver chars dropped:         <0>

received chars:                 <3021>
transmitted chars:              <21>
```

5. To reset all errors and statistics for all ports, enter:

```
system# mset <device_name> -statsreset
```

Note: To report error statistics and reset all errors and statistics for a single port, you could have entered the following in Step 3:

```
system# mset <device_name> -statsr
```

mset Error Message

```
cannot open device
```

The device specified in the message line cannot be opened by `mset`. This could be due to permissions on the device, or the driver is not loaded, or that device actually doesn't even exist. This could also mean that the device name is not specified properly.

Calling for Support

If you need to call Aurora Technologies' technical support for help, make sure that you have completed the following checklist:

Support Call Checklist

1. Serial Number: _____

   (found in the back of this manual, on the hardware, and on the shipping container)

2. SPARCstation model number: _____

3. Solaris version: _____

4. List all peripherals connected to the Comet or Galaxy Multiport Controller card.

5. Comet or Galaxy Multiport Controller software driver version: _____

   (The version number is printed on the driver software media and is displayed when installation is completed.)

6. List the cable pinout description.

7. Verify the type of cables used. (modem, null-modem, etc.)

Telephone support is available Monday through Friday, 8:30AM to 6:00PM Eastern Time. Refer to "Getting Help" on page xii for Customer Service and Support. ❒

APPENDIX A *Cables and Connectors*

This appendix provides information about how to make physical connections to serial ports. It discusses modem and null modem connectors, the standard RS-232 pinouts, and describes some typical cables.

Two terms used frequently in this appendix are:

- Data Communications Equipment (DCE)
- Data Terminal Equipment (DTE)

The term *DCE device* usually refers to a modem. *DTE devices* include terminals, printers, and computers.

Cabling Overview

To connect a peripheral device to an Aurora Communications Controller, you need a break-out-box or octopus cable, and an interface cable. The break-out-box or octopus cable connect directly to the multiport controller card. The interface cable runs the electrical signals from one of the DB-25 or RJ-45 con-

nectors of the break-out-box or octopus cable (DB-25 only) to the device. Since we cannot determine in advance which of the many types of cable you may need, Aurora does not supply this cable. You can purchase ready-made cables from Aurora Technologies or at your local computer store.

DCE and DTE devices send and receive signals through different pins. Aurora's controller cards are configured as DTE devices. In general, when connecting a DCE device to a controller card, use *modem* (or straight-through) cables. For DTE devices, such as terminals and printers, use *null-modem* cables.

Since difficulties with cabling account for most installation problems, this appendix describes the different types of cables to use. You should check the design of the cables you buy against the cables defined in this chapter to verify that you have the correct cables.

Serial Connector Pinouts

Terminals, modems, and printers typically communicate through an RS-232 (serial) interface. All of Aurora's DB-25 connectors are DTE type RS-232 compatible serial connectors.

Figure 5 shows the location of the RS-232 pins supported by the controller cards.

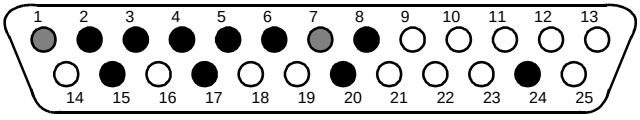


FIGURE 5. *Serial Connector Pin Diagram (male DTE)*

Table 11 shows the connector pinouts for both synchronous and asynchronous devices. Shaded pins 15, 17 and 24 are used exclusively for synchronous transmission.

TABLE 11. *Serial Connector Pinout*

Pin Number	RS-232 Signal (401S+)	RS-232 Signal (800S+)	V.24 Signal	Direction
1	Chassis GND	Chassis GND	102	None
2	TXD	TXD	103	Output
3	RXD	RXD	104	Input
4	RTS	RTS	105	Output
5	CTS	CTS	106	Input
6	DSR	DSR/ RxC_{in}*	107	Input
7	Signal GND	Signal GND	–	None
8	DCD	DCD/ TxC_{in}*	109	Input
15**	TxC_{in}	–	114	Input
17**	RxC_{in}	–	115	Input
20	DTR	DTR/ TxC_{out}*	108/2	Output
24**	TxC_{out}	–	113	Output

* Bi-modal pins carry clock signals in sync mode on 800S+ only.

**Synchronous Clock Signals. (available on 401S+ only)

Signal Descriptions

Table 12 provides a description of each signal on the serial connector. Shaded rows indicate synchronous signals.

TABLE 12. *Pin Signal Descriptions*

Signal	Description
Chassis GND	Chassis (Earth) Ground. Prevents static discharge.
TXD	Transmit Data. Sends data to peripheral device.
RXD	Receive Data. Receives data from the peripheral.
RTS	Request to Send. Signal asking if peripheral device is ready to receive data.
CTS	Clear to Send. Signal from the peripheral device indicating readiness to accept data.
DSR	Data Set Ready. Indicates the remote device is ready to communicate.
Signal GND	Signal Ground. Provides reference level for other signals.
DCD	Data Carrier Detect. Signal indicating that the peripheral device has detected a signal from the remote peripheral device over the telecommunications channel.
RxC_{in}	Receive Data Clock. Input for receiver signal element timing from a synchronous, DCE device.
TxC_{in}	Transmit Data Clock. Input for transmitter signal element timing from a synchronous, DCE device.
DTR	Data Terminal Ready. Indicates the local device is ready to communicate.
TxC_{out}	Transmit Data Clock. Output for transmitter signal element timing generated on synchronous multiport controller cards.

Asynchronous Serial Cables

This section first describes modem cables which, as the name suggests, are typically used for connecting modems to the controller card. Next, it describes null-modem cables which are typically used for other peripherals such as terminals and printers.

Asynchronous Modem Cables

Modem cables are designed to connect devices that send and receive data on different pins, which is the case when you connect a DCE device to a DTE device. In a serial modem cable, the pins in the connectors are wired straight-through: 1-1, 2-2, 3-3, etc.

Since the controller cards are configured as DTE devices, use a modem cable when connecting modems and other DCE devices to the card. You must obtain a modem cable with a male connector for the modem end and a female connector for the system end. You can obtain the correct cable from most computer stores.

Figure 6 shows the wiring of an asynchronous serial modem cable that enables the S Series card to communicate with the modem. For a listing of the signal names of the pins, see Table 12 on page 52.

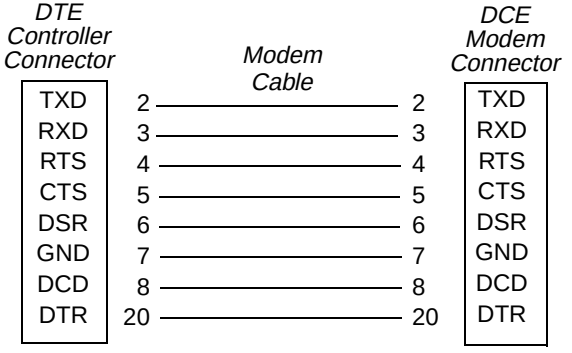


FIGURE 6. *Asynchronous Modem Cable (DTE to DCE)*

Asynchronous Null-Modem Cables

You should consult your device manual to determine what type of null-modem cable is required. Note that all three cables shown here can support XON/XOFF software flow control since pins 2, 3, and 7 are wired the same way.

Null-modem cables are designed to connect devices that send and receive data on the same pins, which is the case when you connect a DTE device to another DTE device. Because both devices are trying to send and receive on the same pin, the wiring of the cable must swap those signals.

Since the Aurora controller cards are configured as DTE devices, you must use a null-modem cable to connect them to other DTE devices such as terminals, printers, and plotters.

Other signals in the RS-232 specification have the same requirements and, depending on your peripheral, may have to be swapped also. Therefore, there are several different types of null-modem cables available.

Three of the most common null-modem cables used for asynchronous communication are

- XON/XOFF
- Request-To-Send (RTS)
- Data Terminal Ready (DTR)

The differences among the three cables are the type of flow control that they support:

- XON/XOFF supports software flow control only, with its three-wire configuration for XON/XOFF handshaking (see Figure 7).
- RTS supports hardware handshaking when the peripheral uses the *Request To Send* (pin 4) signal (see Figure 8).
- DTR supports hardware handshaking when the peripheral uses the *Data Terminal Ready* (pin 20) signal (see Figure 9).

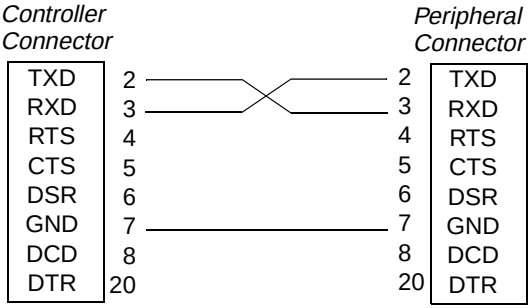


FIGURE 7. *Asynchronous Null Modem Cable (XON/XOFF Handshaking)*

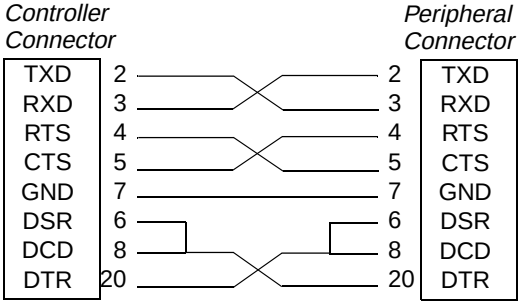


FIGURE 8. *Asynchronous Null Modem Cable (RTS Handshaking)*

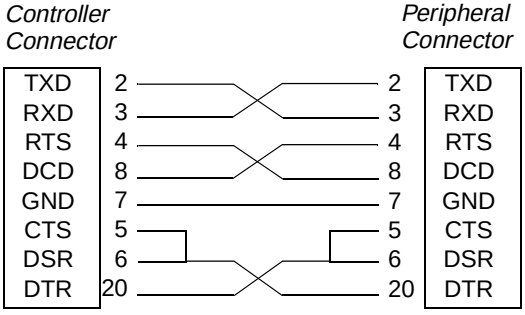


FIGURE 9. *Asynchronous Null Modem Cable (DTR Handshaking)*

Figure 10 is provided to assist you making a RJ-45 to DB-25 null modem connection.

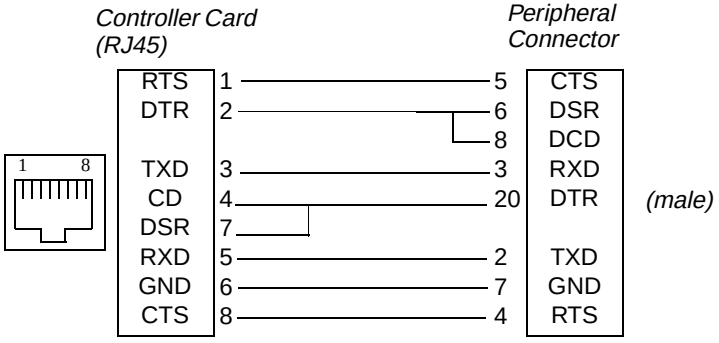


FIGURE 10. *Asynchronous RJ45-to-DB25 Null Modem Adapter (Out-of Band Flow Control)*

Synchronous Serial Cables

For successful synchronous communications, you must carefully consider what pins your clock signals are on. Note that the clock pins of the 800S+ cards differ from those of the 401S+. The 800S+ cards have bi-modal (shared signal) clock pins in nonstandard locations where the 401S+ has dedicated clock pins in the locations defined by the RS-232 specification. As a result, different cabling is required.

> **Note:** Regardless of which products you use, you must ensure that a single clock source is supplying both ports.

Cabling for the 800S+ Cards

The on-board processor on the 800S+ cards does not bring out the synchronous clock signals on the standard pins 15, 17, and 24. Instead, it brings out TxC_{in} on pin 8, RxC_{in} on pin 6, and TxC_{out} on pin 20 (Refer to Table 11 on page 51).

Connecting Modems to 800S+ Cards. Since synchronous modems provide clock, your cabling must connect pin 6 to pin 17 and pin 8 to pin 15. The clock signal from the controller card (TxC_{out}) isn't needed, so pin 20 is wired straight through and used as DTR. Refer to Figure 11.

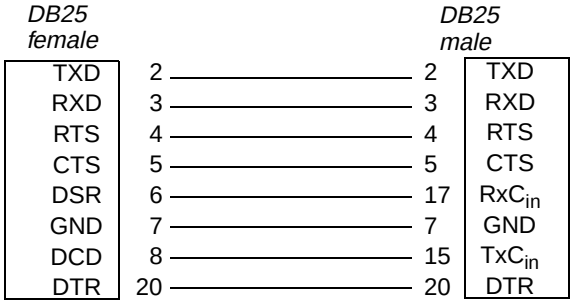


FIGURE 11. *Synchronous Modem Wiring for 800S+ cards*

There are three options available for achieving the proper wiring:

- Build your own cable
- Use an Aurora Sync Clock Adaptor
- Use an Aurora DB25 Connector Box, setting the jumpers appropriately.

When building your own cables, refer to the wiring diagram in Figure 11. If you need the controller card to supply clock, wire pin 20 to pin 24.

If you plan to use the sync clock adaptor, you would use it with a straight-through modem cable since the adaptor is wired as shown in Figure 11. Note that if you are using the sync clock adapter with a straight-through modem cable, the controller card cannot supply clock.

If you are using one of the DB25 Connector Boxes, the jumpers inside the box allow you to configure each DB25 connector independently. The jumper settings required for synchronous

modems are shown in Figure 12. Setting the jumpers this way configures the connector to conform with Figure 11.

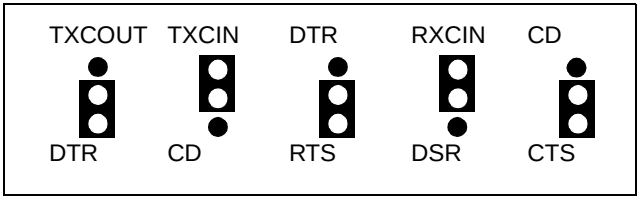


FIGURE 12. *Synchronous port jumper settings for connector boxes*

To allow the controller card to supply the clock signal, switch the left-most jumper to the TxC_{out} position. For more information on the connector boxes, refer to the *DB25 Connector Box User's Manual* that was shipped with your box.

Connecting Other Synchronous Devices to 800S+ Cards. Since most synchronous DTE devices cannot provide clock, cabling for them must connect pin 20 to pins 15 and 17 to provide access to (TxC_{out}). When building your cables, refer to Figure 13 for the wiring diagram.

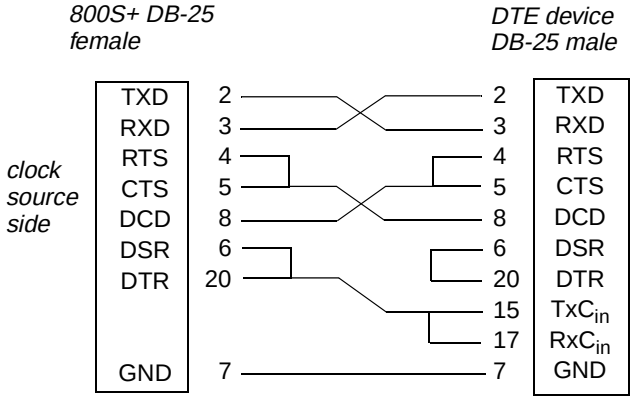


FIGURE 13. *Synchronous Null-Modem Cable for 800S+ cards*

Note that the cable in Figure 13 must have the clock source side connected to the controller card.

Cabling for the 401S+ Card

The Model 401S+ Communications Controller features a new processor that allows all clock signals to be brought out on their standard pins. This simplifies cabling.

Note: A single clock source must supply both ports.

Connecting Synchronous Modems to 401S+ Cards. Since all clock signals are brought out on their standard pins, you can use the straight-through modem cables shown in Figure 14 to connect synchronous modems to the 401S+ card. No adaptors are necessary.

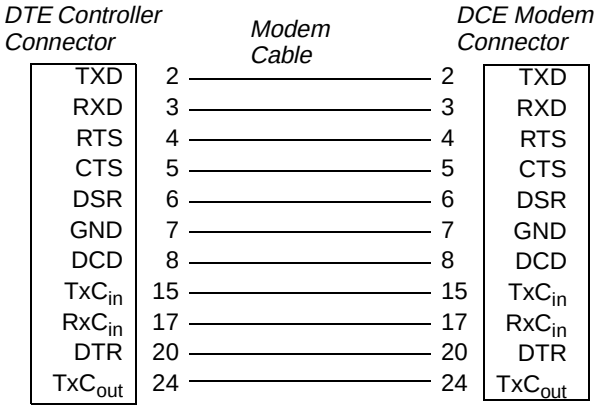


FIGURE 14. *Straight-through synchronous modem cable.*

Connecting Other Synchronous Devices to 401S+ Cards. Figure 15 shows the null-modem cable design for connecting 401S+ cards to synchronous DTE devices.

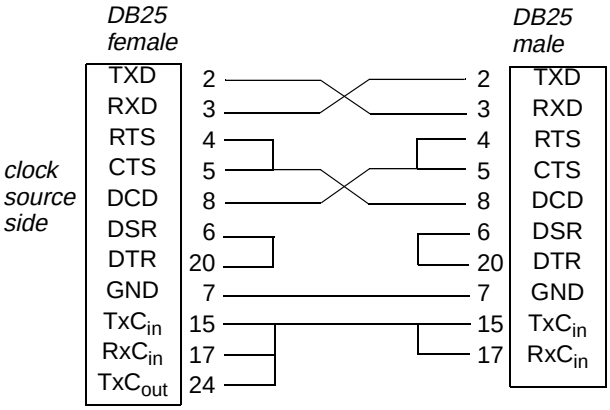


FIGURE 15. *Null-Modem Cable for the 401S+ cards.*

Note that this is a general purpose synchronous cable that can be used for other, non-Aurora ports. ❒

APPENDIX B *Warranty*

Warranty Information

Hardware

All Aurora Technologies, Inc. hardware products are warranted against defects for two years from the date of delivery. Buyer agrees that if this product proves defective, Aurora Technologies, Inc. is obligated only to repair, replace or refund the purchase of this product at Aurora Technologies, Inc.'s discretion. The warranty is void if he product has been subjected to alteration, neglect, misuse or abuse; if any repairs have been attempted by anyone other than Aurora Technologies, Inc.; or if failure is caused by accident, acts of God, or other causes beyond the control of Aurora Technologies, Inc.

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Aurora Technologies, Inc.
646 Summer Street
Brockton, MA 02302
USA

90 Day Technical Support

Products must be registered with Aurora Technologies, Inc.'s Customer Service and Support (CSS) organization to receive the 90 Day Technical Support. You must fill out and mail or FAX the warranty card that is included with the product before receiving technical assistance.

What you get during the 90 Day Technical Support

90 Day Technical Support is provided by e-mail, FAX, or by telephone. Customers calling in for technical support on current Aurora technologies, Inc. products will receive a response within four (4) business hours. Customer's e-mails or faxed requests will receive a response within twenty-four (24) business hours.

The Technical Support hours in Massachusetts are

> 8:30 a.m. - 6:00 p.m. Eastern Time,
> Monday through Friday, excluding holidays.

Services provided under the 90 Day Technical Support Plan are:

- Help on installation and configuration
- Help diagnosing problems with Aurora hardware and standard released Aurora device drivers.
- Help navigating and locating existing Aurora documentation
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Product Information Worksheet

Please record the following information about your Aurora Multiport controller card and workstation.

Multiport controller card serial number: _____

Workstation model: _____

Operating System version: _____

Peripheral/Port assignments

Slot	Port	Peripheral
___	0	
	1	
	2	
	3	
	4	
	5	
	6	
	7	
	8	
	9	
	10	
	11	
	12	
	13	
	14	
	15	